

Annual Report to the Governor and Work Plan

State Buildings Energy Efficiency Program

**Prepared by the Utah Energy Office, Department of Natural Resources
June 30, 2004 (updated July 6, 2004)**

Executive Summary

From June 23, 1999 to June 30, 2004, the State Buildings Energy Efficiency Program (SBEEP) produced gross energy savings of least \$12,896,472, and net energy efficiency savings of \$1,964,023. With state budget limitations continuing into fiscal year 2005(FY05), the FY05 SBEEP Work Plan relies on energy savings generated from performance contracting to meet the program goal of \$20 million in savings by 2010. Using this approach, cost savings from energy conserved in FY05 bring the cumulative program savings to 64.5 percent of the Governor's \$20 million goal for savings by 2010.

Background

This report of the State Building Energy Efficiency Program is prepared pursuant to 63-9-67 (2) of the Utah State Code as enacted in H.B. 119, Quality Growth Act of 1999 and pursuant to the Executive Order entitled "Establishing A State Building Energy Efficiency Program" as released by Governor Michael Leavitt dated June 23, 1999, paragraph 3d. For FY04, the Utah Energy Office (UEO), at the Department of Natural Resources, in conjunction with the Division of Facilities Construction and Management (DFCM), administered the State Buildings Energy Efficiency Program (SBEEP). The focus for the program is Governor Michael Leavitt's SBEEP goals as established by Executive Order and authorized under 63-9-67 (1) (f). Under the Governor's Executive Order titled of June 23, 1999, the SBEEP program is directed to:

1. Achieve significant energy savings through implementation of a comprehensive and

coordinated energy efficiency plan, the goal of which is to reduce energy costs by a cumulative total of \$20,000,000 by 2010;

2. Provide, through these savings, a source of funding for the LeRay McAllister Critical Land Conservation Fund;
3. Provide energy management services, technical energy assistance, and financial coordination necessary to obtain energy cost reductions and increased efficiency in state facilities.

Since the Executive Order's effective date, there have been organizational changes, continued interagency cooperation between the Utah Energy Office (UEO) and the Division of Facilities Construction and Management (DFCM), SBEEP staff attrition and recruitment for new staff to help achieve the Governor's SBEEP goals. Currently, one program manager is assigned full-time to the program with at least two engineering slots to be filled for FY05.

Progress to Date: SBEEP Savings Achieved to June 30, 2004

Table 1 includes a conservative base of savings attributable to SBEEP from June 23, 1999 through June 30, 2004. A total of 245 state-owned buildings have now achieved higher levels of energy efficiency by participating in SBEEP. The total gross cumulative energy savings for this effort equals \$12,896,472, up from the FY03 total of \$8,344,511 and represents the value of kilowatts, kilowatt hours, and therms of natural gas conserved. It should be noted that gross savings does not factor out the cost of energy conservation

measures. Also shown in Table I, net energy cost savings totals \$1,964,023, up from the FY03 total of \$1,004,970. The net savings represents the value of energy units conserved less the actual cost of energy conservation measures. For accounting purposes under the Quality Growth Act, it is important to note that corresponding reductions to an agency's utility budget have not occurred during a fiscal year if that agency experienced cost per unit increases for gas and electricity used.

Due to the extreme scarcity of state funding for retrofit projects continuing into FY05, SBEEP and DFCM have relied on performance contract partnerships with energy service companies (ESCOs) and independent financial institutions to achieve program goals. At no up-front cost to the State of Utah, energy savings from performance contracts are used to generate a revenue source that pays for completed energy retrofits (see section below entitled, "Private Sector Performance Contracting for Technical Services and Project Financing"). The bulk of savings reported in Table I is derived from performance contract-based projects. To date, a total of \$10,935,449 in gross energy savings is attributable to SBEEP's use of performance contracting. This represents 84.8 percent of SBEEP's total gross savings achieved.

Phase I of the ESCO-based performance contract for the Department of Correction's Bluffdale Prison came on-line in FY04 to produce energy savings. These savings are included in Table I. Three additional ESCO-based projects are beginning construction with energy savings to accrue during FY05. Additional ESCO-based procurements will be undertaken in FY05. Because there is a 6-13 month delay for ESCO-based projects between procurement, completion of the engineering grade technical energy audit, contract negotiation, financing, construction and saving

accrual; any savings from these new procurements will not appear until FY06.

TABLE I - SBEEP Energy Cost Savings¹

	Totals through FY03	FY04 Results	Totals from June 23, 1999 through FY04
# of State Buildings	133	112 (with 13 additional buildings in-progress for FY05)	245
Gross Energy	\$8,344,511	\$4,551,961	\$ 12,896,472

¹ For building retrofit projects funded from the DNR Public Building Loan Program loans or lease purchases with energy service companies, net savings only occur after the term of the loan or lease is fulfilled. Due to budget constraints, no additional loans have been tendered from the DNR Public Building Loan Program. For the New Building Low Energy Design Program, incentive payouts were made to the architectural and engineering design teams that exceed ASHRAE 90.1 (1989) by 25%. Projects include: State Library, WSU Browning Hall, Wasatch State Park Clubhouse, UDOT Traffic Control Center, and Davis County Court Addition. Energy efficient new buildings require fewer long term O&M appropriations compared to inefficient counterpart buildings. Data for total SBEEP savings through June 30, 2002 (the corrected FY02 reported savings) include: New Building Design Program (5 buildings at \$71,073), University of Utah (88 buildings at \$2,657,682), and the DNR complex (5 buildings at \$10,358). For FY03, savings are derived from: the new Soldier Hollow Clubhouse (\$7,599), Matheson Courthouse continuous commissioning (\$75,000 in modeled savings), SLCC South City Campus continuous commissioning (\$38,600), DFCM energy retrofits completed in FY03 (33 projects with \$498,961) in savings funded in FY02, New Building Low Energy Design Program (7 buildings at \$282,093 in continuing savings), DNR Buildings (5 buildings at \$5,245), Utah National Guard Camp Williams wind unit (\$16,041 total to 12/31/02), and University of Utah (\$4,681,859). For FY 04, savings is derived from the Soldier Hollow Clubhouse (at least \$7,599 in continued savings), Matheson Courthouse (\$107,000 for FY04 in modeled savings + \$41,000 in actual savings not reported in FY03), SLCC South City Campus (\$19,400 in additional savings to total \$58,000), continued savings from DFCM funded projects in FY04 (at least \$498,961 in savings for projects funded in FY02 with no data available for projects funded in FY03), New Building Low Energy Design Program (at least \$282,093 in continuing savings), State Prison (\$122,949 in guaranteed construction period savings for the Phase I project completed in FY04), and University of Utah (\$3,472,959). As of August 4, 2003, 470 Vending Miser units had been installed in state and higher education facilities with a \$44.71/unit in average annual savings as estimated by Bayview Technologies (per Aug. 2003 State of Utah electrical rates). This total estimated savings is not included for the "04 SBEEP Annual Report to the Governor pending verification by UPL of Vending Miser persistence of savings. Total building projects begun in FY04 but not to be completed until FY05 include the Ogden Regional Center (1 bldgs.), UVSC (12 bldgs.), and the Utah State Prison Phase II (112 bldgs.). Savings for FY05 should exceed the FY04 savings. The entire UPL rate refund for 2000 (\$311,760) was deposited to the LeRay McAllister Fund in FY00 as required by the Quality Growth Act. (63-38-18), but is not "net savings" as defined by the Act. 63-9-67(1)(d). The Quality Growth Act requires that 50% of net savings be reported to the legislature per 63-9-67(2)(b)(i) and deposited to the LeRay Fund, subject to legislative appropriation. [63-9-67(2)(c)].

Efficiency Measure Savings			
Estimated Net Energy Efficiency Measure Cost Savings	\$1,004,970	\$959,053	\$1,964,023

SBEEP Accomplishments for FY04

Needs Assessment Surveys

The purpose of an assessment survey is to identify state buildings most needing assistance from SBEEP. Although 26 site assessments were completed in FY03, SBEEP staff attrition in FY04 required SBEEP to consider less time-consuming approaches for completing energy assessments. Each year, DFCM procures a consultant to complete on-site condition assessments of state facilities. Recognizing the opportunity for an interagency joint venture, SBEEP began working with DFCM in May 2004 to establish an energy component to DFCM's condition assessments. This component should be included in the next DFCM-issued request for proposal (RFP) expected for early 2005 release. For isolated smaller state buildings of less than 40,000 square feet, SBEEP works with DFCM to conduct energy audits.

Internally Funded Building Retrofit Projects

Between \$85 million and \$90 million is needed to upgrade the energy efficiency of state buildings. Limited capital improvement funding for energy saving retrofit projects is derived from State General Funds appropriated to DFCM. However, the need for funding far exceeds the availability. DFCM funding for energy retrofits includes \$1,809,328 for FY02, \$1,324,900 for FY03, and \$484,200 for FY04. With these funding limitations, performance contracting has become the preferred funding mechanism for building retrofit projects. During FY04, any energy capital improvement monies from DFCM were allocated to help buy-down energy performance contracts. Projects completed in prior years using State

General Funds continue to generate energy savings, and those savings are included in Table I.

Bonding is another option to derive the capital needed for energy retrofits. But, recognizing the current state budget situation and bonding preferences of the legislature, SBEEP and DFCM have relied on competitively procured private sector companies to complete performance contracts for state buildings.

Private Sector Performance Contracting for Technical Services and Project Financing

Structured similar to equipment or capital leases, a private sector ESCO completes retrofit work, helps to arrange financing with a third-party partner, and provides an annual savings guarantee. During a performance contract, project economics are structured to allow a cash flow of annual energy savings sufficient to pay off project costs over the life or term of the financing agreement. The ESCO approach allows projects to proceed with very limited capital outlays from the State of Utah while avoiding construction delays and lost opportunity costs of the legislatively appropriated design/bid/build approach.

Depending on project size, financing cost for funding a performance contract averages 0.2 percent higher in annual interest over the financing available through the traditional bond sources.² In accordance with the State of Utah Code 63-9-67 (1) (d), paybacks on energy projects funded through a performance contract with an ESCO can range up to 25 years depending upon the energy economics of a particular upgrade. Typically, a performance contract-based state building project does not accrue net savings until after the performance contract term has ended and the financing fully retired.

² Per an unpublished study by Julio Rovi P.E., with the Cadmus Group, Inc., Arlington, Virginia, lost opportunity costs when using the more time-consuming bonding approach for financing state building retrofits exceed the increase in cost of money for ESCO-based financing.

As a model project completed in 2001 for the University of Utah, the private sector partnering approach generated \$44 million in energy efficiency improvements for 81 campus buildings with no upfront capital expense to the University or State of Utah. The ESCO approach allowed the University of Utah to upgrade campus-wide energy systems and improve efficiency while resolving issues with deferred maintenance and occupant comfort. It should be noted that net savings will not be realized until the term of the University of Utah's performance contract has expired in FY23. Savings to date from the University of Utah project total \$10,812,500.

Experience gained from the University of Utah project has allowed SBEEP and DFCM to streamline standard procurement documents and procedures, accelerating procurement and construction for new projects. The FY03 procurement resulted in three ESCO selections that will treat a total of 112 buildings for the Department of Corrections Utah State Prison at Bluffdale (1.13 million square feet), the Ogden Regional Center (108,702 square feet), and 12 buildings for Utah Valley State College (1.18 million square feet). Table II shows the status and overall economics for these endeavors including the two phases of the Prison project.



Energy upgrades for 112 buildings at the Utah State Prison will save over \$500,000 per year in energy costs.

The four projects include \$21,653,076 in improvements with \$1,099,997 in annual electrical and gas savings along with an additional \$179,182 in water savings. Engineering and construction for Phase I of the Prison project were completed in FY04 with

the other Phase II project under construction for FY05. Attachment II shows the detailed scope or work and individual energy conservation measures being implemented for each of these performance contract-based projects.

TABLE II SBEEP Performance Contracts FY04 and 05

Name of Institution	Number of Buildings	Total Cost	Total Est. Annual Energy Savings³
Utah Department of Corrections – Prison Phase I	112 buildings completed	\$6,554,873	\$234,618
Utah Department of Corrections – Prison Phase II	Construction in-progress for the buildings completed during Phase I	5,026,112	275,002
Utah Valley Community College	12 buildings – construction in progress	9,493,424	556,888
Ogden Regional Center	1 buildings – construction in progress	578,667	33,489
TOTALS:	125 buildings – construction in progress	\$21,653,076	\$1,099,997

It should be noted that the State of Utah's use of performance contracting for the University of Utah and the Utah State Prison have both received national recognition from the U.S. Department of Energy's Rebuild America Program.⁴

Energy Efficient New Design

In 2001 the Utah Energy Office, the DFCM, and the State Building Board adopted a new standard for energy performance in new state buildings. Under this standard, an integrated design team of architects and engineers is expected to design new state buildings that perform 25 percent more efficiently than the

³ In addition to the energy savings derived from these retrofits, SBEEP estimates an additional \$179,182 in water savings.

⁴ "University Saves Millions with Massive Performance Contract", Rebuild America Partner Update, U.S. Department of Energy, Washington D.C., May-June 2003 issue, pp. 1 & 8. Rebuild America and its strategic partners serve as valuable technical resources to SBEEP.

new commercial energy code adopted in January 2001 (ASHRAE 90.1-1999). This performance level significantly lowers life cycle costs for new buildings with little or no increases in project budgets. For FY04, SBEEP worked with DFCM reviewers to complete plan reviews for three new state buildings and one substantial remodel. The Eureka UDOT Building, University of Utah Health Sciences Building, West Jordan Courts Building, and the University of Utah Marriott Library were reviewed by SBEEP staff to determine compliance to the new standard.

In FY04, SBEEP met with DFCM and Spectrum-Bennion Engineering to study the impact of the newer commercial energy code on the Building Board's 25%+ standard. As the newly adopted code standard for Utah's commercially-sized buildings, ASHRAE 90.1-2001 may meet or exceed the current Building Board standard. The results of this study are forthcoming for FY05.

Last year's SBEEP annual report included a description of the new Utah State University Utah House in Kaysville that continues to serve as a high energy performance building model. In FY04 SBEEP worked with the Utah Valley State College (UVSC) in developing another high performance model in Capitol Reef National Park. In May 2004 SBEEP received federal approval for a proposal to the U.S. Department of Energy that secures National Renewable Energy Laboratory design assistance for the UVSC project. UVSC's Sleeping Rainbow Ranch education facility will house 20-25 students in a year-round interactive research facility. Because the facility is remote to power and gas supplies, the 13,000 square foot complex must be highly energy efficient and rely on passive and active renewable energy sources such as photovoltaic solar panels for electricity and trombe walls for heating. The National Park Service has also requested that the complex be low-impact on

the environment by minimizing water usage and waste.



In FY04 SBEEP secured a grant for design assistance to Utah Valley Community College's Sleeping Rainbow Ranch Project

Continuous Commissioning Projects

Continuous commissioning (also referred to as retro-commissioning or re-commissioning) optimizes the performance of a building's heating, ventilation and air conditioning systems. Cost studies prepared by SBEEP engineers indicate an excellent energy savings return in state buildings through continuous-commissioning.⁵

Scheduled to occur every 4-5 years, the continuous commissioning process analyzes an existing building's energy using systems and includes follow-on improvement measures to reduce energy consumption. The process maintains or restores a building's environment to meet the occupant needs. The process assures that existing building controls, heating and ventilation equipment, chillers, boilers, and pumps operate at peak levels of energy efficiency. Continuous commissioning specialists evaluate and revise settings and schedules while revisiting the general condition and maintenance of energy-using equipment. To date, SBEEP has relied on a commissioning specialist from Texas A&M's Energy Systems

⁵ For reference, see analysis prepared by James Hood P.E., Utah Department of Natural Resources dated April 12, 2002. Also, see Turner, W. D. et al., "Continuous Commissioning Process" presentation handouts, Texas A&M Energy Systems Laboratory, April 2004, which shows an achievable 20% average utility bill reduction per building and simple paybacks less than 2 years.

Laboratory to complete model projects and train State of Utah facilities personnel.

For FY04, the State Building Energy Efficiency Program and Texas A&M continued to monitor the savings accruing from the FY03 continuous commissioning of the 420,000 square foot Matheson Courthouse. Texas A&M's utility modeling projects a savings of \$107,000 in FY04 in addition to the \$116,000 in actual savings achieved in FY03. Through the Courthouse's continuous commissioning, over 700 heating/cooling system operating hours have been eliminated by creating new start-up and shut down sequences. This helps to reduce the building's energy consumption index from \$1.08 per square foot to \$0.77 per square foot or a 25% reduction in the building's \$400,000 annual cost of utilities.



The Matheson Courthouse saves 25% on utility bills through continuous commissioning.

During FY04, continuous commissioning was also completed for the 350,000 square foot South City Campus of the Salt Lake Community College (SLCC). For the SLCC project, Texas A&M determined a saving of \$58,000 for FY04 with \$7,000 in savings through better control sequencing during the 2003 Christmas holiday. The commissioning helped to reduce the building's annual energy consumption index from \$.97 per square foot to \$.80 per square foot or a 17.5% reduction in the building's \$340,000 annual utility load.



In FY04 the South City Campus of Salt Lake Community College saved 17.5% through continuous commissioning

Following the results of these model continuous commissioning projects, Utah State University established an in-house continuous commissioning team in FY04, completing commissioning for the Education Building in FY04 and scheduling the Fine Arts Visual Building for early FY05. The team has not only addressed energy efficiency issues, but improved building operation and occupant comfort at each building. USU has also begun commissioning of the Biotech and Business buildings.

In FY04, SBEEP also worked with Texas A&M and the Utah Division of Facilities Construction and Management to begin commissioning for the Cannon Health Building and the Department of Natural Resources' Edge of the Cedars Museum in Blanding. Initial visits have uncovered opportunities for dramatic energy savings and for improved occupant comfort. Savings reports from these buildings will be incorporated with next years' annual SBEEP Annual Report. Because of the success of commissioning, as measured by utility dollars saved per program dollar spent, SBEEP is requiring retro-commissioning as integral to each performance contract's scope of work. The performance contracts for the Prison Phase II and Utah Valley Community College include retro-commissioning.

The draft 5-year SBEEP plan drafted by the Utah Energy Office in May 2004 recommends establishing an in-house SBEEP continuous commissioning team of engineers and technicians as a way to best deliver commissioning energy savings to state

buildings. This recommendation includes the establishment of a state revolving loan fund where agencies fund the cost of continuous commissioning from resulting savings. The attached FY05 SBEEP Work Plan includes initial steps for establishing the loan program and the in-house team.

Energy Procurement

SBEEP worked with the Division of State Purchasing in FY04 to promote use of equipment that has earned the Environmental Protection Agency's Energy Star Label for agencies purchasing under state contracts. Energy Star products includes: office equipment, heating and cooling equipment, lighting, exit signs, appliances, water coolers, and vending machines. The Division of Purchasing website is being updated for purchasers to more easily locate Energy Star-rated models of this equipment. For state-wide contracts, the Division of State Purchasing is modifying requisitions to include the Energy Star labels for any equipment information web-linked to the Utah Division of State Purchasing website. For computer-related equipment procurement conducted by a multi-state Western States Cooperative Agreement (WSCA) during FY04, the Division of State Purchasing revised the specification requiring vendors to label all Energy Star computer products at their websites.



Compact Fluorescent Bulbs Under State Contract That Meet Energy Star Performance Levels

For bulk purchases such as natural gas, the Division of State Purchasing has endeavored to

“lock” up gas prices through long-term contracts and hedging. For FY04, Wasatch Energy served as the State of Utah's natural gas supplier under state contract; resulting in \$3,305,000 in savings compared to using standard Questar I2 rates (see Table III). Although the margin available under the new FY04 state contract with Wasatch Energy is more favorable to the State of Utah, the volatile nature of national and regional natural gas markets may result in future natural gas cost increases for state facilities. For FY04, the State of Utah's Wasatch Energy contract offered natural gas at an average \$5.25 per decatherm versus \$6.50 per decatherm under the I-2 rate.

TABLE III – Natural Gas Commodity Savings⁶

Fiscal Year	Annual Cost Savings
FY02	\$794,804
FY03	1,514,208
FY04	\$3,305,000

Renewable Energy Projects for State Facilities

Camp Williams' highly visible 225 KW wind unit was out of production in FY04 due to warranty and maintenance issues with the manufacturer (NEG Micon) and re-assignment of the Utah National Guard operator to Iraq⁷. As of June 1, 2004, using \$750,000 from the Army Corp of Engineers and \$50,000 from the Utah Energy Office, the Utah National Guard and the U.S. Department of Energy's National Renewable Energy Laboratory began procuring a larger 750 KW wind unit for Camp Williams. The second unit's procurement includes a multi-year maintenance contract for both a new and the existing 225 KW wind units to insure more reliable operation and optimum electrical production for the base.

⁶ The savings for FY04 does not include savings or losses for natural gas purchases made during June 04 – that information was not available as this report was compiled. Source: Utah Division of State Purchasing.

⁷ For the prior year, the 225 KW Micon unit produced 224,312 KWH or 4% of the camp's electrical needs. This KWH production equated to a cost savings of \$16,041 since the May 20, 2000 installation date.



Crews erect the 50 meter wind anemometer for the Department of Corrections at Bluffdale.

The wind site northeast of Camp Williams is also being tested for installation of wind power equipment. In FY04, the Utah Energy Office helped procure and install a 50-meter wind anemometer to collect twelve months of wind data near the Fred House Academy in Draper. If this resource proves tenable, wind units will be installed at the Prison site in FY05 using a performance contract with an energy service company, Johnson Controls Incorporated. Any units at this site would be owned by the Utah Department of Corrections.

Geothermal water nearing 185 degrees Fahrenheit lies under the Utah State Prison at Bluffdale. During FY04 SBEEP worked with Corrections, DFCM, and Johnson Controls Inc. to tap the resource and heat the 38,856 square feet Oquirrh Units #1-4 using direct-use geothermal technology. With the funding arranged as a master lease with CitiCapital, there is no upfront cost to the Department of Corrections for system engineering design, labor, or equipment. The retrofit cost of the Oquirrh system is \$519,061. The Prison geothermal system will be expanded in FY05 to include the Wasatch Dorm, UCI Sewing and Furniture Shop, and the SSD Dormitory at an estimated cost of \$2,258,153. The first two weeks of operation during January 2004 for the Oquirrh geothermal system saved \$16,804. The entire geothermal project for Corrections is guaranteed to save \$186,937 per year. As part of the project, the Utah Department of Transportation, in conjunction with the Utah

Department of Environmental Quality, will use discharge water from the geothermal system to construct a wetlands area adjacent to the Jordan River. A study is also underway to assess the air quality value derived from the geothermal project verses the old gas-fired steam system.



Phase I of a direct-use geothermal heating project was completed in FY04 at the Utah State Prison.

Energy Information Management System Improvements

In order to help assess SBEEP effectiveness in meeting the goal of \$20 million in energy savings by 2010, the Utah Energy Office is working with DFCM to transfer management of the web-based utility information management program from UEO to DFCM. As a web-based program, state facility managers from across Utah would monitor facility energy use over time, identify utility billing problems, and verify levels of energy savings from efficiency improvements. In FY04 SBEEP negotiated with Utah Power and Questar to provide monthly data for updating the database. The information system includes 1100 buildings.

On June 17, 2004 facility managers from Utah's colleges and universities received instructions for benchmarking state buildings under the Environmental Protection Agency's Energy Star Program. Existing buildings that qualify with a score of 75 against other comparable buildings within the Energy Star database receive special recognition. For new buildings, Energy Star requires performance at least 25% better than the national commercial energy code.

Education and Information Campaign for FY04

In conjunction with the Governor's Power Forward initiative, energy alerts were issued to state agencies to encourage employee energy conservation during periods of peak summer and winter electricity system power loads. As a reminder to employees during the October 2003 National Energy Awareness Month, SBEEP distributed 100 large posters from the U. S. Department of Energy to all State of Utah agencies and institutions of higher education. These posters were displayed in state buildings throughout the 2003-04 winter months. SBEEP hopes that the posters have encouraged occupant-based actions to reduce building energy costs.

During FY04, SBEEP also cosponsored eight seminars and workshops, three more than FY03. SBEEP targeted seminar and workshop invitations to state facility managers and DFCM staff as well as the independent architects and consulting engineers who work on state buildings (see Table IV). A report distributed by the U.S. Department of Energy suggests workshops and seminars as highly effective for reducing building energy use.⁸

TABLE IV – SBEEP Cosponsored Seminars and Workshops in FY04

Seminar & workshop topics	Cosponsors
Geothermal Heat Pump Technology Seminar and Tour (Murray High School) – August	APEM Murray School District Geothermal Heat Pump Consortium

⁸ A metric for workshops and seminars has been developed for Utah's SBEEP using Schweitzer, Martin, Donald W. Jones, Linda G. Berry, and Bruce E. Tonn, "Estimating Energy and Cost Savings and Emissions Reductions from the State Energy Program Based on Enumeration Indicators Data", January 2003, Oakridge National Laboratory, pages 29-31 as reference. The Oakridge study suggests energy workshops to be one of the most cost effective ways to reduce energy use in state buildings. The Oakridge metrics show 324.4 source BTUs per attendee per workshop. SBEEP estimates this savings at 51% electricity and 49% gas and derates the Oakridge metric by using 3,413 site BTUs per KWH versus the 11,300 source BTUs per KWH used by Oakridge. The Utah SBEEP metric shows an average of 206.65x10E6 BTUs saved per attendee per year based, an assumed 25 attendees per workshop unit, and total BTUs of 5,166.25 x 10E6 BTUs per workshop.

2004	
Insight to Today's Lighting – October 1, 2003	Codale Lighting Division of State Purchasing
Optimizing Fan Performance – January 8, 2004	Utah Power Utah Eng. Experiment Station Utah Industries of the Future
Lighting Technology Seminar - February 1, 2004	Division of State Purchasing GE Lighting Institute Grainger Industrial Supply Utah Association of Professional Energy Managers (APEM)
Continuous Commissioning for Buildings - April 2, 2004	ASHRAE APEM
High Performance Buildings – April 20, 2004	ASHRAE AEPM NREL
Energy Tour of New State Office Buildings – April 30, 2004	APEM Capitol Preservation Board
Daylighting by Design – May 27, 2004	Utah AIA

Although the actual metered savings attributable to education and information campaigns are difficult to quantify, the U.S. Department of Energy reports that each dollar invested in activities such as energy education, information dissemination, energy seminars, and workshops generates up to \$7 in energy savings.⁹

Recognition of State Energy Champions

Recognition of exemplary performance is an important aspect of SBEEP. On October 10, 2003, the Association of Professional Energy Managers (APEM), in conjunction with then Lt. Governor Olene Walker, awarded the Division of Facilities Construction and Management an "Energy Champion" award for energy efficiency efforts with the Matheson Courthouse that resulted in an Environmental Protection Agency (EPA) Energy Star rating for the Courthouse. The Energy Star Program recognizes buildings that are in the top 25 percent for efficiency compared to all other similar buildings. The Matheson Courthouse joins three other Energy Star-qualified state buildings from FY02 and FY03: the

⁹ Schweitzer, page 18.

Department of Environmental Quality
Building, the Utah Tax Commission Building,
and the USU Utah House.



Lt. Governor Olene Walker recognizes DFCM's Mike Butler and Kevin Healy as energy champions (October 2003)

FY04 Issues and Opportunities

The following issues and opportunities have arisen since the Executive Order was issued. All of these affect the success of SBEEP:

1. LeRay McCallister Fund - State agencies continue to express concern over the energy provisions of the Quality Growth Act. State agencies have traditionally used excess energy savings to pay for deferred maintenance of state facilities, additional energy saving equipment upgrades, and utility rate increases. However, Quality Growth Act provisions require donation of half of energy efficiency savings to the LeRay McCallister Fund, resulting in a disincentive for building managers to pursue energy savings that they can't keep. On September 24, 2003 the SBEEP manager briefed members of the Quality Growth Commission on this issue. The commission agreed that the responsibility for acquiring any portion of net savings under the Quality Growth Act resides with state budget offices including the Governor's Office of Planning and Budget and the Legislative Fiscal Analyst's Office. The commission also acknowledges that identification of net savings is difficult within the current climate of rising utility

rates and the aging infrastructure of state facilities.

2. Energy Price Uncertainties – Following the energy market uncertainties and crisis of 1999, average utility rates for state buildings rose 12.3 percent per kilowatt hour, 23.1 percent per kilowatt of electricity, and 41.9 percent per decatherm of natural gas by 2004 (see Tables V). Although some agencies may receive supplemental appropriations from time to time, the net effect of rate increases is increased energy cost per square foot to operate state buildings. Unfortunately, these increases create an impression that energy use is rising rather than declining. Instead, total energy use is actually declining on a square foot basis even though total utility costs per square foot may be rising. As an opportunity arising from the energy crisis, state agencies are now more concerned with long-term rate stability and reliability of utility services, raising inherent interest in SBEEP. SBEEP has worked with the Higher Education Fuel and Power Task Force to troubleshoot the impact of higher utility rates on higher education (that impact is currently measured at a \$11,029,957 shortfall). SBEEP is working with a task force that includes the Commissioner's Office of the Board of Regents, DFCM, Governor's Office of Planning and Budget, and the Legislative Fiscal Analyst's Office to complete a study in accordance with the Utah Appropriations Act for FY05. The study will document fuel and power increases for higher education; quantify the energy savings being achieved; and recommend measures, strategies, programs and opportunities for energy cost containment at Utah's colleges and universities.

TABLE V – Utility Rate Increases

Changes in Average Natural Gas and Electric Prices for State Buildings 1998-2004

	Natural Gas (\$/Decatherm)	Power (\$/KWH)	Power (\$/KW)
1999	3.70	.0247	7.67
2000	4.60	.0260	7.67
2001	5.50	.0260	6.67
2002	4.40	.0283	7.84
2003	4.60	.0276	8.10
2004	5.25	.0277	9.44

3. SBEEP Staffing Issues and Coordination with DFCM – Due to attrition and in-house reorganization at DNR, there has been a complete turnover of SBEEP support staff since the June 23, 1999 Governor’s Executive Order. This attrition and reorganization resulted in some lost program momentum as well as coordination issues with DNR and DFCM.

In July 2003 as well as December 2003, the Department of Natural Resources and the Department of Administrative Services discussed moving staff and responsibility for the State Buildings Energy Efficiency Program from the Utah Energy Office to the Division of Facilities Construction and Management (DFCM). Unable to arrive at a mutually satisfactory agreement during FY04, the two agencies have agreed to revisit this issue in the future.

It should also be noted that although the current staffing scenario (3.0 FTEs) can meet the Governor’s minimum \$20 million goal for energy savings, an in-house pro-forma drafted in FY04 indicates that a full contingent of up to 10 in-house professional staff would be needed to carry out a more aggressive SBEEP effort. That aggressive scenario would more than double energy saving for state buildings. The aggressive scenario includes an in-house continuous commissioning program for state buildings. However, with only 3.0 FTEs currently available (including the two vacant engineering positions), staff will continue to focus on the more cost effective SBEEP

program elements, including the outsourcing of retrofit and continuous commissioning projects via performance contracts with energy service partners. Support from the Governor’s Office and the Utah Legislature is needed to expand the program to more aggressive levels.

4. Water Savings – During FY04, SBEEP explored other utility cost saving opportunities for state buildings including retrofits to reduce the cost of waste removal and water supply. If the definition of savings under Section 63-9-67 of the Utah State Code is interpreted to include energy along with water and waste savings, performance contracts can capture the additional savings for the State of Utah. For the Utah State Prison alone, water-conserving retrofits in Phase I and Phase II can save the Department of Corrections and State of Utah an estimated \$168,342 per year, and waste management measures can save an additional \$19,189.
5. Air Quality Connection – SBEEP efforts reduce the need for combustion of fossil fuels, resulting in improved air quality, secondary benefits to human health and reduced need for emissions credit trading. The Division of Air Quality and the Utah Energy Office are promulgating policies and procedures to better identify and quantify the air quality benefits arising from energy efficiency. With the Governor’s aggressive goal for upgrading the energy efficiency of state buildings, the contribution to regional and state air quality provides an added value for SBEEP. Moreover, the attached SBEEP Work Plan for FY04 is consistent with the goals and objectives of the Western Regional Air Partnership and the June 22, 2004 resolution calling on states to develop 30,000 megawatts of clean energy. SBEEP provides additional capacity through energy

conservation and efficiency as well as the renewable projects being developed for state facilities.

6. Utility-based Incentives – Under tariffs 115, 116, and 125, Utah Power and Light (UPL) offers rebates for qualified energy conservation projects that involve electrical savings. For the four ESCO-based energy improvement projects underway or completed in FY04, the total in UPL tariff 125 incentive payments is \$822,364. These payments are being applied against the cost of each project, effectively shortening the payback period on each project. State facilities are eligible to receive a rebate only if they pre-file a letter of intent with Utah Power. SBEEP forwarded copies of the model Utah Power Letter of Intent and instructions to all state agencies, including higher education, in FY04 to alert them to the rebate opportunity and encourage agency participation. In FY04, Utah Power unveiled a “self directed” program which allows larger electric power customers to defer Customer Efficiency Service bill charges each month for up to 80 percent of the improvement costs. It is important for state agencies to timely participate in the utility incentive program and not lose this funding opportunity.
7. Calculation of Actual Energy Cost Savings Quantification of gross and net cost savings is difficult when extraneous variables impact the calculations. In a typical year, weather is not consistent, utility rates change, building occupant schedules are revised, utility billing errors occur, and there is more energy consuming equipment added to building loads (such as more computers). In order to best quantify savings for a particular project and adequately account for significant variables, SBEEP has adopted the approach taken by the International Performance Measurement

and Verification Protocol (IPMVP) in FY03. In the case of performance contracts with ESCOs, the IPMVP is stipulated for energy cost savings calculations. To maintain program integrity and as funding allows, SBEEP works with both DFCM and UPL to secure third-party verification of energy savings.

Outlook to the Future: Program Work Plan for FY05

With due consideration to SBEEP’s overall purpose, as outlined in the original June 1999 Executive Order, and with no changes delineated by the Walker administration, the FY03 SBEEP Work Plan has been updated for FY04 to include appropriate performance goals, milestones, and responsibilities for SBEEP staff (see Attachment 1).

SBEEP Contact Information:

Michael Glenn (UEO) – 538-5436
James Hood, P.E. (UEO) – 538-5251
Kent Beers (DFCM) – 538-3418
Ricy Jones (DFCM) – 538-3820
Reed Taylor (Purchasing) – 538-3709

ATTACHMENT 1
Draft FY05 Work Plan
State Building Energy Efficiency Program (SBEEP)
(Action Items, Milestones, and Responsibilities)

The purpose of the State Building Energy Efficiency Program is to:

1. Exemplify state buildings as models for energy efficiency,
2. Reduce the energy cost of government operations to meet the Governor's goal of \$20 million in energy saving for state buildings by 2010,
3. Contribute to better air quality through energy savings in state buildings with wise use of Utah's energy resources.

For FY05, this Work Plan has been updated from the FY04 Work Plan. **As the Utah Energy Office completes a 5-year strategic plan in FY05 for the State Building Energy Efficiency Program, some of the goals, action items, and milestones be updated.**

SBEEP FY05 Goals, Action Items, and Milestones	DNR - Mike Glenn (team leader) – related responsibilities	DNR – PE Engineer Position (vacant) - related responsibilities	DNR – EIT Engineer Position (vacant) – related responsibilities	DRCM – related responsibilities
Goal #1 – Exemplify state buildings as models for energy efficiency.				
1. Develop at least 1-2 public news releases per year highlighting energy projects for state government buildings. For FY05 include the Prison geothermal project for media coverage (by June 30, 2005).	Work with Dept. of Corrections Public Affairs to draft and release news releases	Provide any information for releases	Provide any information for releases	Provide any information for releases and review drafts
2. Compile the energy savings achieved for state buildings from July 1, 1999 to June 30, 2005 and prepare an annual SBEEP report to the Governor and GOPB (by June 30, 2005).	Prepare report to the Governor.	Provide necessary information and data.	Provide necessary information and data.	Provide necessary information and data and review draft before finalization.
3. Train and work with state facility managers to identify and qualify 2-3 state government buildings as Energy Star Buildings for special recognition (by June 30, 2005).	Organize training event	Provide technical assistance	Gather the relevant information and help state facility managers to process the candidate buildings to EPA	NA
4. Work with other energy organizations (ASHRAE, AIA, and/or APEM) to organize an annual recognition event for state facility managers including Energy Star recognition (by October 31, 2004).	Coordinate with outside organizations as well as the Public Affairs staff at DNR and Admin. Services to organize and hold a recognition event.	Provide nominees for recognition	Provide nominees for recognition	Provide nominees for recognition
Goal #2 - Reduce the energy cost of government operations to meet the Governor's goal of \$20 million in energy saving for state buildings by 2010 – energy information component.				
1. Maintain/update the database of state facility energy	Oversight	NA	Work with DRCM and	Provide any updated

SBEEP FY05 Goals, Action Items, and Milestones	DNR - Mike Glenn (team leader) – related responsibilities	DNR – PE Engineer Position (vacant) - related responsibilities	DNR – EIT Engineer Position (vacant) – related responsibilities	DFCM – related responsibilities
contacts for distribution of energy information and workshop schedules (ongoing to June 30,2005).			APEM to maintain the state facility managers email contact list	information
2. Work with Energywise and Power Forward in issuing alerts to general state employees that encourage energy conservation (through June 30, 2005)	Oversight	NA	Prime responsibility for drafting alerts for distribution	Provide information as needed
3. For the SBEEP web page, complete a general review and update of all pages and the bulletin board(complete by December 31, 2005)	Oversight – review relevant pages and submit updates to webmaster	Review relevant pages and submit updates to webmaster	Review relevant pages and submit updates to webmaster	Provide review and comments to SBEEP
4. To raise the energy expertise of state facility managers, provide up to 5 workshops or seminars for state facility managers (by June 30, 2005)	Oversight – develop topics and contact the SEP Program Manager for funding.	Work with ASHRAE to provide support for 1-2 workshop or seminar.	Work with APEM to provide support for the five workshop or seminar and to manage workshop and seminar logistics.	Provide input and support to SBEEP
5. To disseminate SBEEP successes and other energy information to facility managers, participate in regular meetings of UAPPA (attend quarterly UAPPA meetings)	Attend 3-4 UAPPA meetings as scheduled for FY04	Attend 3-4 UAPPA meetings as scheduled for FY04	Attend 3-4 UAPPA meetings as scheduled for FY04	(already participating in UAPPA)
Goal #3 - Reduce the energy cost of government operations to meet the Governor's goal of \$20 million in energy saving for state buildings by 2010 – existing buildings component.				
1. Establish an energy component to the DFCM condition assessment work that allows SBEEP to prioritize candidate buildings for the various SBEEP subprograms (by the March 31, 2005 RFP release date).	Oversight – insure that the DFCM RFP for FY05 includes the energy component to the assessments.	Assist with any assessments needing special technical assistance.	Assist with any assessments needing special technical assistance.	Issue the RFP with an energy component.
2. Work with DFCM to complete an FY05 procurement Cycle II (for undertaking additional ESCO-based projects). Participate in selection meetings with DFCM, review proposals, and select top qualifying ESCOs for oral interviews by June 30, 2005.	Submit nominations to DFCM for Cycle II projects and participate in all meetings and assignments.	As requested, participate in procurement meetings and assignments.	As requested, participate in procurement meetings and assignments.	Clear projects with Building Board, issue RFP's, oversee the RFP process, issue contracts to selected ESCOs.
3. For long term tracking of energy usage and savings, maintain a web-based database with direct data transfer capabilities from Utah utilities. Provide on-line access to participating facility managers by March 31, 2005.	Provide support as necessary	NA	Provide support as necessary	Oversight responsibility in conjunction with IT staff – train local facility managers to assess database and insure that data is transferred from utilities in a timely manner.
4. Participate in weekly project meetings for the ESCO-based projects at the Utah State Prison, UVSC, and the Ogden Regional Center and any other projects begun in FY05 – provide leadership and technical assistance to the projects (ongoing through June 30, 2005).	Participate weekly as necessary.	Participate weekly as necessary.	Participate weekly as necessary.	Participate weekly as necessary.
5. In accordance with the 5 year SBEEP plan, develop and issue in-house loans to state agencies and institutions	Work with UEO and DNR management to	NA	NA	NA

SBEEP FY05 Goals, Action Items, and Milestones	DNR - Mike Glenn (team leader) – related responsibilities	DNR – PE Engineer Position (vacant) - related responsibilities	DNR – EIT Engineer Position (vacant) – related responsibilities	DFCM – related responsibilities
to complete retrocommissioning and continuous commissioning (initiate demonstration loans by March 31, 2005).	establish a UEO-based loan program, develop loan rules and procedures, and oversee contract processes.			
6. Review any Cycle II technical energy audits completed by ESCOs and establish scope of work for each facility by September 30, 2003.	Review TA's and compile comments by deadlines	Review TA's and compile comments by deadlines	Review TA's and compile comments by deadlines	Receive and review comments from UEO staff.
7. Develop and finalize any Cycle II contracts with ESCOs including finalizing financing portion of contracts by June 30, 2005.	Review draft contracts for DFCM.	Participate in contract negotiations as necessary	Participate in contract negotiations as necessary	Prepare final contracts for ESCO work and financing.
8. Help secure Utah Power rebates for ESCO and DFCM funded projects by releasing information to state facility managers and ESCOs before projects begin. (ongoing through June 30, 2005).	Oversight	Provide information and assistance as necessary	Provide information and assistance as necessary	Coordinate with ESCOs for rebates to buydown retrofit costs.
9. For Cycle I projects to be completed in FY05, inspect ESCO work as work proceeds and follow-up on problems, Complete final inspection of Cycle I ESCO-funded retrofits and issue letters of acceptance (ongoing through June 30, 2005).	Oversight – insure that DFCM has 3 rd party reviewers on contracts.	Complete inspections as necessary.	Complete inspections as necessary.	Insure that contracts are listed to 3 rd party reviewers. Request SBEEP engineer involvement as necessary.
10. Collect savings reports from ESCO-based model projects (Cycle I) and include in FY05 SBEEP annual report.	Oversight and reporting per SBEEP annual report	Review/check data	Review/check data	Receive and review draft report
11. Monitor continuous commissioning savings for the Matheson Courthouse, SLCC South Campus, USU buildings, etc. and submit results for the FY05 annual SBEEP report.	Oversight	Responsibility for monitoring energy savings. Develop in-house expertise for measuring savings from continuous commissioning.	Responsibility for monitoring energy savings. Develop in-house expertise for measuring savings from continuous commissioning.	NA
12. Develop an inhouse continuous commissioning capability by training UEO staff engineers during FY05	Oversight	Participate in training as identified by the SBEEP manager and UEO management.	Participate in training as identified by the SBEEP manager and UEO management.	NA
Goal #4 - Reduce the energy cost of government operations to meet the Governor's goal of \$20 million in energy saving for state buildings by 2010 – new buildings component.				
1. Identify new buildings for SBEEP engineer participation in design development, design review, value engineering, energy model review, and code review. Provide reports to DFCM and AE firms following design reviews (ongoing to June 30, 2005).	Oversight – meet at least quarterly with DFCM staff responsible for new building construction.	Complete all tasks as requested by DFCM on-time	Assist the lead SBEEP engineer as requested Complete a study of costs and benefits from the UEO and DFCM design incentive program.	Facilitate the involvement of SBEEP for new buildings
2. Insure that contractors adequately commission new state buildings by reviewing the commissioning plan new buildings, participate in commissioning, and	Oversight	Complete all tasks as requested on-time and complete quality control	Assist the lead SBEEP engineer as requested	Facilitate the involvement of SBEEP for new buildings

SBEEP FY05 Goals, Action Items, and Milestones	DNR - Mike Glenn (team leader) – related responsibilities	DNR – PE Engineer Position (vacant) - related responsibilities	DNR – EIT Engineer Position (vacant) – related responsibilities	DFCM – related responsibilities
develop commissioning recommendations for each project (ongoing through June 30, 2005).		review of contractor-based commissioning		
3. Work with Spectrum Engineers on evaluation and development of more aggressive energy design standards for new state buildings. Participate in meetings and insure that any new standard meets or exceeds the DFCM standard of ASHRAE 90.1 1989 +25 percent.	Oversight	Prime responsibility for reviews and reports (2-3 buildings for FY04)	NA	Receive SBEEP reports.
Goal #5 – Communicate the contributions of SBEEP energy efficiency projects to better air quality				
1. Distribute a copy of the annual SBEEP Report and savings to GOPB, DNR Admin., members of the Governor's State Office of Energy Advisory Council, DEQ, etc. by July 15, 2004.	Prime responsibility to insure distribution of the SBEEP Annual Report	NA	NA	NA
2. (see goal above for Energy Star ratings of state buildings and the goal for development of press releases)				
Goal #6 - Provide for general administration of SBEEP				
1. Develop a schedule and management fee structure under a 5-year SBEEP Strategic Plan that includes some cost reimbursement options for services provided by SBEEP from state agencies (by June 30, 2004).	Prime responsibility for completing 5-year SBEEP Strategic Plan including any fee structures	Provide input to proposed plan	Provide input to proposed plan	NA
2. Hire 2 additional staff as allowed by funding with approval of DNR and UEO management to expedite strategic energy saving goals. Provide adequate training to new staff for CEM certification and for retrommissioning expertise (by March 31, 2005)	Work with UEO management and DNR personnel office to undertake the hiring process, review resumes, and check references.	NA	NA	NA
3. Attend weekly Utah Energy Office staff meetings and any meetings of the Building Board, Higher Education Fuel and Power Task Force, UAPPA, etc.	Attend and participate	Attend and participate	Attend and participate	Participate as necessary

ATTACHMENT 2a

FY05 Capital Improvement Energy Projects Funded Through Energy Performance Contracts – Utah Dept. of Corrections Phase II

FIM	Location	Measure Description	Installed Cost (\$)	Guaranteed Annual Energy Utility Savings (\$)	Guaranteed Annual Water Savings (\$)	Total Annual Savings	One Time Avoided Capital Expenditure	Utah Power Incentive (\$)	Simple Payback (yrs.)	ASHRAE Expected Equipment Life (yrs.)
2a	Wasatch Dom. HW	Expand Geothermal System	\$734,542	\$ 104,976	\$ -	\$ 104,976		\$ -	7.0	24
2b	UCI Sewing/Furniture	Expand Geothermal System	\$308,366	\$ 3,163	\$ -	\$ 3,163		\$ -	97.5	20
2c	SSD Dormitory	Expand Geothermal System	\$480,703	\$ 15,674	\$ -	\$ 15,674		\$ -	30.7	25
2d	Wasatch Boiler #1 Burner Changeout	Reduce Burner Capacity	\$340,131							21
9	Wasatch, Oquirrh's, Uintah, UCI	Insulate Steam Lines	\$17,663	\$ 7,931	\$ -	\$ 7,931		\$ -	2.2	20
18	Wasatch Boiler	Install Boiler Stack economizers	\$152,986	\$ 21,118	\$ -	\$ 21,118		\$ -	7.2	20
19	Wasatch Boiler	Install O2 trim on existing boilers	\$97,413	\$ 8,302	\$ -	\$ 8,302		\$ -	11.7	15
40	Facility Wide	Replace Steam Traps	\$261,244	\$ 89,603	\$ 675	\$ 90,278		\$ -	2.9	15
42	Administration	Recommissioning	\$98,438	\$ 3,940	\$ -	\$ 3,940	\$ 24,610	\$ 14,640	21.3	15
44	Uintah 5	AHU Retrofit	\$471,698	\$ 126	\$ -	\$ 126		\$ 645	3,734.6	20
46	Uintah 5	Upgrade Electrical Service	\$188,807	\$ 138	\$ -	\$ 138		\$ 757	1,358.6	30
47	Oquirrh's Admin AHU's 2 and 5	Variable Volume Air	\$67,781	\$ 1,883	\$ -	\$ 1,883		\$ 10,297	30.5	17
48	Uintah Admin. Support AHU's (typ. of 2)	Variable Volume Air	\$57,082	\$ 882	\$ -	\$ 882		\$ 4,821	59.3	17
49	Oquirrh's 1-4	Recommissioning	\$236,536	\$ -	\$ -	\$ -	\$ 59,134	\$ -	NA	15
50	Uintah 1-4	Recommissioning	\$259,312	\$ 8,862	\$ -	\$ 8,862	\$ 64,828	\$ -	29.3	15
51	Wasatch Culinary	Repair Condensate issues	\$38,848	\$ -	\$ -	\$ -		\$ -	NA	15
54 a	Wasatch	Migrate to complete DDC	\$268,712	\$ 266	\$ -	\$ 266		\$ 1,417	1,003.0	15
54 b	Timpanogos	Migrate to complete DDC	\$88,954	\$ 239	\$ -	\$ 239		\$ 1,269	366.6	15
54 c	Uintah	Migrate to complete DDC	\$283,396	\$ 282	\$ -	\$ 282		\$ 1,504	999.2	15
54 d	Oquirrh	Migrate to complete DDC	\$78,222	\$ 383	\$ -	\$ 383		\$ 2,100	198.6	15

54 e	Fred House	Migrate to complete DDC	\$79,296	\$ 210	\$ -	\$ 210		\$ 1,153	372.8	15
55	Wasatch Laundry	Laundry Ozone Treatment/Water reuse	\$60,110	\$ 4,816	\$ 1,323	\$ 6,140		\$ -	9.8	15
62	Promontory	Smoke Evac System Repair	\$57,992	\$ -	\$ -	\$ -		\$ -	NA	20
65	Promontory	Recommissioning	\$84,645	\$ 2,206.14	\$ -	\$ 2,206	\$ 21,161	\$ -	38.4	15
66	Wasatch A Block Lavs	Plumbing Retrofit	\$213,235	\$ -	\$ 21,240.00	\$ 21,240.00		\$ -	10.0	15
Total Selected Project			\$5,026,112	\$ 275,002	\$ 23,238	\$ 298,240	\$ 169,733	\$38,602	16.7	

ATTACHMENT 2b

FY05 Capital Improvement Energy Projects Funded Through Energy Performance Contracts – Utah Valley Community College

		Installed Cost (\$)	COST SAVINGS			Incentive Buydown (\$)	Simple Payback (Years)	
			Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)			Total (\$)
Building and ECM Number & Name								
AUTOMOTIVE TRADES BUILDING								
L1	Electronic Ballasts and T8 Fluorescent Lamps	68,817	6,221	-912	0	6,684	14,929	8.1
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	4,287	379	-54	0	475	887	7.2
L3	Incandescent to Compact Fluorescent Retrofit Kits	103	9	-1	0	14	19	5.9
L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	135	8	-1	0	9	16	13.8
L6	Mercury Vapor to Metal Halide	12,598	-657	120	0	-510	0	
L6a	Metal Halide to New High Bay T5 Fixture	109,609	6,300	-921	0	5,379	15,090	17.6
L8	Remove Existing Fixtures	4,497	2,588	-582	0	2,006	8,642	-2.1
W1	Water Conservation Measures	3,724	0	147	1,726	1,873	0	2.0
C1	Upgrade The Existing Energy Management Control System	59,369	27	125	0	152	103	390.6
M1	Repair/Re-commission Mixed Air Dampers	7,738	77	-1,186	0	-1,109	396	
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		270,876	14,951	-3,265	1,726	14,972	40,082	15.4

		Installed Cost (\$)	COST SAVINGS			Incentive Buydown (\$)	Simple Payback (Years)	
			Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)			Total (\$)
Building and ECM Number & Name								
BROWNING ADMINISTRATION								
L1	Electronic Ballasts and T8 Fluorescent Lamps	25,458	1,826	-150	0	2,647	5,236	7.6
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	35,483	3,854	-290	0	4,742	10,348	5.3
L3	Incandescent to Compact Fluorescent Retrofit Kits	180	27	-2	0	42	71	2.6

L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	4,674	-288	23	0	-265	0	
L8	Remove Existing Fixtures	118	138	-14	0	124	457	-2.7
W1	Water Conservation Measures	14,748	0	202	1,098	1,300	0	11.3
C1	Upgrade The Existing Energy Management Control System	224,755	4,493	0	0	4,493	15,571	46.6
M1	Repair/Re-commission Mixed Air Dampers	23,213	882	0	0	882	4,530	21.2
M6	Install A VFD On Existing VAV System	14,648	245	0	0	245	1,260	54.5
M7a	Replace The Existing WSHP System With A VAV Reheat System	0	0	0	0	0	0	
M7b	Replace The Existing WSHP System A High Efficient WSHP System	43,152	262	-25	0	237	354	180.7
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		386,429	11,438	-256	1,098	14,448	37,829	24.1

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

BUSINESS BUILDING

L1	Electronic Ballasts and T8 Fluorescent Lamps	11,637	1,005	-79	0	1,489	2,801	5.9
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	37,646	3,526	-304	0	4,504	10,539	6.0
L3	Incandescent to Compact Fluorescent Retrofit Kits	1,129	118	-11	0	179	375	4.2
L6	Mercury Vapor to Metal Halide	5,332	-118	10	0	-108	0	
L8	Remove Existing Fixtures	3,765	1,473	-149	0	1,324	5,008	-0.9
W1	Water Conservation Measures	10,639	0	195	1,003	1,198	0	8.9
C1	Upgrade The Existing Energy Management Control System	228,995	5,257	0	0	5,257	20,246	39.7
E1	Replace Existing Transformers	0	0	0	0	0	0	
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	0	0	0	0	0	0	
M14	Variable Speed Hot Water Pumping	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		299,142	11,263	-338	1,003	13,844	38,971	18.8

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

CENTRAL PLANT (LOWER PLANT)

L1	Electronic Ballasts and T8 Fluorescent Lamps	5,599	352	-26	0	540	940	8.6
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	691	91	-6	0	109	228	4.2
W1	Water Conservation Measures	714	0	1	11	12	0	59.5
C1	Upgrade The Existing Energy Management Control System	253,834	0	0	0	0	0	
E1	Replace Existing Transformers	0	0	0	0	0	0	
E2	Install Electrical Substation	3,692,479	346,940	0	0	346,940	0	10.6
M9	Install Cooling Tower With VFD And Plate And Frame Heat Exchanger	1,461,578	6,121	0	0	6,121	23,328	235.0
M10a	Replace Chillers With New High Efficient Chillers w/VSD	744,173	16,557	0	0	16,557	59,836	41.3
M10b	Replace Chillers With New High Efficient Chillers	0	0	0	0	0	0	
M11	Install Thermal Storage Tank	0	0	0	0	0	0	
M12	Install VFD On Chiller	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	51,437	12,838	0	0	12,838	47,083	0.3
M14	Variable Speed Hot Water Pumping	65,363	13,830	0	0	13,830	50,614	1.1
M15	Use Boilers as Primary Heating Source and Covert to Dual Fuel	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		6,275,869	396,729	-31	11	396,947	182,030	15.4

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

COMPUTER SCIENCE & ENGINEERING (& UPPER PLANT)

C1	Upgrade The Existing Energy Management Control System	238,617	5,544	6,854	0	12,398	21,349	17.5
M1	Repair/Re-commission Mixed Air Dampers	7,738	84	-643	0	-559	432	

M11	Install Thermal Storage Tank	0	0	0	0	0	0	
M12	Install VFD On Chiller	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		246,355	5,628	6,211	0	11,839	21,781	19.0

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

ENVIRONMENTAL TECH

L1	Electronic Ballasts and T8 Fluorescent Lamps	5,290	154	-10	0	370	361	13.3
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	350	11	-1	0	22	31	14.2
W1	Water Conservation Measures	2,112	18	0	91	109	93	18.5
C1	Upgrade The Existing Energy Management Control System	169,626	130	0	0	130	499	1,305.8
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M17	Replace Electric Heating System With A Fossil Fuel Heating System	0	0	0	0	0	0	
M18	Replace Electric DHW Heater With A Natural Gas Fired Unit	0	0	0	0	0	0	

TOTAL OF RECOMMENDED ECMs		177,377	313	-11	91	631	985	279.4
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Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

EVENTS CENTER

L1	Electronic Ballasts and T8 Fluorescent Lamps	296	24	-3	0	30	84	7.0
L6a	Metal Halide to New High Bay T5 Fixture	108,776	48	-4	0	1,038	149	104.7
L8	Remove Existing Fixtures	4,980	2,724	-246	0	3,471	8,444	-1.0

W1	Water Conservation Measures	1,679	0	171	168	339	0	5.0
C1	Upgrade The Existing Energy Management Control System	84,813	8,260	0	0	8,260	31,809	6.4
E1	Replace Existing Transformers	0	0	0	0	0	0	
M5	Constant Volume Single Zone Unit To VAV	129,365	5,717	0	0	5,717	29,357	17.5
TOTAL OF RECOMMENDED ECMs		329,909	16,772	-82	168	18,856	69,842	13.8

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

GUNTHER TRADES BUILDING

L1	Electronic Ballasts and T8 Fluorescent Lamps	45,947	3,062	-562	0	4,130	8,713	9.0
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	4,482	531	-99	0	593	1,530	5.0
L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	97,505	3,413	-610	0	2,953	9,505	29.8
L6	Mercury Vapor to Metal Halide	1,942	46	-8	0	72	129	25.3
L7	New L.E.D. Exit Fixtures	81	5	-1	0	17	16	4.0
W1	Water Conservation Measures	18,621	0	383	1,876	2,259	0	8.2
C1	Upgrade The Existing Energy Management Control System	31,381	3,357	8,894	0	12,251	12,926	1.5
E1	Replace Existing Transformers	0	0	0	0	0	0	
M1	Repair/Re-commission Mixed Air Dampers	7,738	427	-2,226	0	-1,799	2,191	
M4	Constant Volume Dual Duct Unit To VAV	0	0	0	0	0	0	
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	0	0	0	0	0	0	
M14	Variable Speed Hot Water Pumping	0	0	0	0	0	0	
M16	Re-commission Existing Heat Recovery Unit	12,287	61	2,218	0	2,279	312	5.3
M19	Install Automated Blast Gates On Dust Collection System	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		219,985	10,901	7,989	1,876	22,753	35,321	8.1

Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

LEARNING RESOURCE CENTER

L1	Electronic Ballasts and T8 Fluorescent Lamps	83,777	6,455	-1,358	0	8,671	20,437	7.3
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	9,166	1,042	-182	0	1,167	2,851	5.4
L3	Incandescent to Compact Fluorescent Retrofit Kits	154	10	-2	0	16	28	7.7
L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	343	22	-5	0	22	69	12.5
L7	New L.E.D. Exit Fixtures	245	19	-5	0	51	70	3.4
W1	Water Conservation Measures	16,078	0	255	1,371	1,626	0	9.9
C1	Upgrade The Existing Energy Management Control System	199,311	3,040	8,958	0	11,998	11,706	15.6
M1	Repair/Re-commission Mixed Air Dampers	15,476	719	-3,393	0	-2,674	3,691	
M2	Constant Volume Multi-Zone Unit To VAV	0	0	0	0	0	0	
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	0	0	0	0	0	0	
M14	Variable Speed Hot Water Pumping	0	0	0	0	0	0	
M17	Replace Electric Heating System With A Fossil Fuel Heating System	0	0	0	0	0	0	

TOTAL OF RECOMMENDED ECMs	324,548	11,306	4,268	1,371	20,877	38,853	13.7
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Building and ECM Number & Name	Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
		Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		

PHYSICAL EDUCATION

L1	Electronic Ballasts and T8 Fluorescent Lamps	8,653	422	-32	0	694	1,146	10.8
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	2,114	184	-18	0	211	611	7.1
L3	Incandescent to Compact Fluorescent Retrofit Kits	103	18	-1	0	23	42	2.7

L6	Mercury Vapor to Metal Halide	51,282	3,222	-293	0	3,505	10,040	11.8
L6a	Metal Halide to New High Bay T5 Fixture	44,387	3,193	-317	0	2,876	10,655	11.7
W1	Water Conservation Measures	10,315	0	224	707	931	0	11.1
C1	Upgrade The Existing Energy Management Control System	199,311	16,522	0	0	16,522	63,627	8.2
M1	Repair/Re-commission Mixed Air Dampers	15,476	-186	0	0	-186	0	
M2	Constant Volume Multi-Zone Unit To VAV	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	0	0	0	0	0	0	
M14	Variable Speed Hot Water Pumping	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		331,640	23,376	-437	707	24,576	86,120	10.0

		Installed Cost (\$)	COST SAVINGS				Incentive Buydown (\$)	Simple Payback (Years)
			Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)		
Building and ECM Number & Name								
SCIENCE BUILDING								
L1	Electronic Ballasts and T8 Fluorescent Lamps	34,006	2,476	-212	0	3,596	7,361	7.4
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	27,492	2,469	-184	0	3,239	6,584	6.5
L6	Mercury Vapor to Metal Halide	193	14	-1	0	17	49	8.6
W1	Water Conservation Measures	12,797	0	209	966	1,175	0	10.9
C1	Upgrade The Existing Energy Management Control System	212,033	1,987	0	0	1,987	7,653	102.9
E1	Replace Existing Transformers	0	0	0	0	0	0	
M1	Repair/Re-commission Mixed Air Dampers	23,213	1,535	0	0	1,535	7,882	10.0
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M14	Variable Speed Hot Water Pumping	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		309,733	8,481	-188	966	11,549	29,530	24.3

		COST SAVINGS					
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Building and ECM Number & Name		Installed Cost (\$)	Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)	Total (\$)	Incentive Buydown (\$)	Simple Payback (Years)
SORENSEN STUDENT CENTER								
L1	Electronic Ballasts and T8 Fluorescent Lamps	9,582	566	-46	0	868	1,605	9.2
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	4,545	576	-42	0	700	1,516	4.3
L3	Incandescent to Compact Fluorescent Retrofit Kits	510	147	-11	0	163	389	0.7
L4	Incandescent to Halogen	172	19	-1	0	32	51	3.8
L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	131	2	0	0	4	5	32.2
L7	New L.E.D. Exit Fixtures	245	31	-4	0	39	120	3.2
W1	Water Conservation Measures	27,317	0	398	1,296	1,694	0	16.1
C1	Upgrade The Existing Energy Management Control System	157,752	10,121	0	0	10,121	38,977	11.7
M1	Repair/Re-commission Mixed Air Dampers	38,689	627	0	0	627	3,219	56.6
M2	Constant Volume Multi-Zone Unit To VAV	0	0	0	0	0	0	
M3	Constant Volume Reheat Unit To VAV	0	0	0	0	0	0	
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
TOTAL OF RECOMMENDED ECMs		238,943	12,091	294	1,296	14,248	45,883	13.6

		Installed Cost (\$)	COST SAVINGS			Incentive Buydown (\$)	Simple Payback (Years)	
			Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)			Total (\$)
SUMMARY OF ECMs								
L1	Electronic Ballasts and T8 Fluorescent Lamps	299,061	22,562.3	-3,390.0	0.0	29,720	63,615	7.9
L2	Specular Reflectors, Electronic Ballasts, and T8 Lamps	126,255	12,662.3	-1,180.0	0.0	15,763	35,126	5.8
L3	Incandescent to Compact Fluorescent Retrofit Kits	2,178	329.2	-28.0	0.0	437	925	2.9
L4	Incandescent to Halogen	172	19.3	-1.0	0.0	32	51	3.8
L5	New Fluorescent Fixtures w/ Electronic Ballasts, T8 Lamps or Compact Fluorescent Lamps	102,788	3,157.2	-593.0	0.0	2,722	9,595	34.2
L6	Mercury Vapor to Metal Halide	71,346	2,507.2	-172.0	0.0	2,975	10,217	20.5
L6a	Metal Halide to New High Bay T5 Fixture	262,772	9,541.0	-1,242.0	0.0	9,293	25,893	25.5

L7	New L.E.D. Exit Fixtures	570	55.4	-10.0	0.0	107	207	3.4
L8	Remove Existing Fixtures	13,360	6,923.8	-991.0	0.0	6,927	22,551	-1.3
L	Summary of All Lighting	878,503	57,757.7	-7,607.0	0.0	67,975.3	168,179.5	10.4
W1	Water Conservation Measures	118,745	18	2,185	10,313	12,516	93	9.5
C1	Upgrade The Existing Energy Management Control System	2,059,797	58,736	24,831	0	83,567	224,466	22.0
E1	Replace Existing Transformers	0	0	0	0	0	0	
E2	Install Electrical Substation	3,692,479	346,940	0	0	346,940	0	10.6
M1	Repair/Re-commission Mixed Air Dampers	139,280	4,165	-7,448	0	-3,283	22,342	
M2	Constant Volume Multi-Zone Unit To VAV	0	0	0	0	0	0	
M3	Constant Volume Reheat Unit To VAV	0	0	0	0	0	0	
M4	Constant Volume Dual Duct Unit To VAV	0	0	0	0	0	0	
M5	Constant Volume Single Zone Unit To VAV	129,365	5,717	0	0	5,717	29,357	17.5
M6	Install A VFD On Existing VAV System	14,648	245	0	0	245	1,260	54.5
M7a	Replace The Existing WSHP System With A VAV Reheat System	0	0	0	0	0	0	
M7b	Replace The Existing WSHP System A High Efficient WSHP System	43,152	262	-25	0	237	354	180.7
M8	Install Additional Mechanical Equipment For Redundancy	0	0	0	0	0	0	
M9	Install Cooling Tower With VFD And Plate And Frame Heat Exchanger	1,461,578	6,121	0	0	6,121	23,328	235.0
M10a	Replace Chillers With New High Efficient Chillers w/VSD	744,173	16,557	0	0	16,557	59,836	41.3
M9 & M10a	Install Cooling Tower w/VFD and HX and New High Efficient Chillers w/FSD	2,205,751	22,679	0	0	22,679	83,165	93.6
M10b	Replace Chillers With New High Efficient Chillers	0	0	0	0	0	0	
M11	Install Thermal Storage Tank	0	0	0	0	0	0	
M12	Install VFD On Chiller	0	0	0	0	0	0	
M13	Variable Speed Chilled Water Pumping	51,437	12,838	0	0	12,838	47,083	0.3
M14	Variable Speed Hot Water Pumping	65,363	13,830	0	0	13,830	50,614	1.1
M15	Use Boilers as Primary Heating Source and Covert to Dual Fuel	0	0	0	0	0	0	
M16	Re-commission Existing Heat Recovery Unit	12,287	61	2,218	0	2,279	312	5.3
M17	Replace Electric Heating System With A Fossil Fuel Heating System	0	0	0	0	0	0	
M18	Replace Electric DHW Heater With A Natural Gas Fired Unit	0	0	0	0	0	0	
M19	Install Automated Blast Gates On Dust Collection System	0	0	0	0	0	0	
ERM	Energy Resource Manager		17,203	2,283		19,486		0.0

TOTAL OF ALL RECOMMENDED ECMs

9,410,808 540,451 16,437 10,313 585,026 627,225

ATTACHMENT 2c

FY05 Capital Improvement Energy Projects Funded Through Energy Performance Contracts – Ogden Regional Center

		Installed Cost (\$)	Incentive Buydown (\$)	COST SAVINGS			Simple Payback (Years)	
				Electric (\$)	Natural Gas (\$)	Water & Sewer (\$)		Total (\$)
Building and ECM Number & Name								
OGDEN REGIONAL CENTER								
L1	Lighting Upgrades	133,629	31,722	17,948	-224	0	17,724	5.7
W1	Water Conservation Measures	9,132	0	0	309	527	836	10.9
C1	Upgrade The Existing Energy Management Control System	161,937	25,220	5,898	2,796	0	8,694	15.7
M2b	Replace The Existing Chiller (Option B)	260,261	6,502	5,914	0	0	5,914	42.9
M7	Install An Air Curtain On The Automatic Entryways	13,708		-81	930	0	849	16.2
TOTAL OF RECOMMENDED ECMs		578,667	63,444	29,678	3,811	527	34,016	15.1